STACKED-PLATE GAS-EXPANSION COOLER ASSEMBLY, FABRICATION METHOD, AND USE

ABSTRACT OF THE DISCLOSURE

A gas-expansion cooler assembly has an expansion structure with an expansion orifice and an expansion reservoir in fluid-flow communication with an expansion-orifice outlet. A heat exchanger has a heat-exchanger inlet, and a heat-exchanger outlet in fluid-flow communication with the expansion-orifice inlet. The heat exchanger includes at least two heat-exchanger plates stacked in a facing relationship along an assembly axis. Each heat-exchanger plate includes an in-plane channel lying substantially in a plane perpendicular to the assembly axis. The in-plane channels of the adjacent heat-exchanger plates are in fluid-flow communication with each other and with the expansion-orifice inlet to form a continuous high-pressure fluid-flow path from the heat-exchanger inlet to the expansion-orifice inlet. The heat exchanger further includes an axial channel extending parallel to the assembly axis. The axial channels in the adjacent heat-exchanger plates are in fluid-flow communication with each other and with the expansion reservoir to form a continuous exhaust fluid-flow path from the expansion reservoir to an exhaust port.